BACK PAPER ODD/EVEN SEMESTER/ANNUAL EXAMINATION JULY-2026

Course Name:- B.Tech **Semester:- II**

Paper Name:- Engineering Physics **Paper Code:- NBS 201**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks**.

Section - A
Objective Questions

1. Answer all the following questions. **5x3 =15**

i) de-Broglie wavelength is given by
   a. $\lambda = h/mv$
   b. $\lambda = p/h$
   c. $\lambda = hv$
   d. $\lambda = mc^2$

ii) Continuity equation expresses
   a. Energy conservation
   b. Charge conservation
   c. Momentum conservation
   d. Voltage law

iii) A grating has 5000 lines and used in 2^{nd} order, resolving power will
   a. 2×10^3
   b. 1×10^4
   c. 2×10^5
   d. 1×10^6

iv) Multimode step index fiber has _____
   a. Large core diameter & large numerical aperture
   b. Large core diameter and small numerical aperture
   c. Small core diameter and large numerical aperture
   d. Small core diameter & small numerical aperture

v) In which of the following there is no distortion?
   a. Multimode step-index fibre
   b. Single step-index fibre
   c. Glass fibre
   d. Graded index fibre

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Section – B
Short Answer Questions

2. Answer any five of the following questions in maximum 150 words. **5x7=35**

i) Discuss the Davisson–Germer experiment and its significance.

ii) Define phase velocity and group velocity and derive their relation.

iii) State and prove Poynting theorem.

iv) Explain the wedge-shaped film interference and discuss its maxima & minima condition.

v) Explain construction and working of Ruby laser with diagram.

vi) What is persistent current? Distinguish between Type-I and Type-II superconductors.

vii) Discuss XRD characterization technique of nanomaterials. Also, define quantum dots, nanoparticle, nanofilm and nanowires.

Section – C
Descriptive Questions

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3. Answer any two of the following question in maximum 300 words. **2x10=20**

i) Explain in detail the propagation of EM waves in conducting medium.

ii) Explain Fraunhofer diffraction at a single slit and derive its intensity distribution.

iii) Derive relation between Einstein coefficients with proper diagram. And, discuss one application of lasers.

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